

CLAIMS

1. An apparatus for gripping the teat of an animal and assisting in drawing milk from the animal via a compressible milk collector, said apparatus including:

a housing;

a plurality of constricting elements arranged in said housing in touching relation to the milk collector, said constricting elements being selectively operable in constricting and non-constricting modes;

10 means for selectively switching said constricting elements back and forth between non-constricting and constricting modes; and

15 a controller in communication with said means for selectively switching, said controller operative to effect a predetermined timing and sequence for periodically switching said constricting elements between their constricting and non-constricting modes, thereby to compress the teat of the animal drawing milk therefrom.

2. An apparatus according to claim 1, wherein said constricting elements are pneumatically inflatable sack-like elements.

20 3. An apparatus according to claim 2, wherein said means for selectively switching is a pneumatic means.

4. An apparatus according to claim 3, wherein said pneumatic means includes an air compressor and pneumatic air valves, said valves operated by said controller.

25 5. An apparatus according to claim 1 wherein said constricting elements are pairs of complementary displaceable rings.

30 6. An apparatus according to claim 5, wherein said means for selectively switching is a cam-based mechanical switching system.

7. An apparatus according to claim 5, wherein said pairs of complementary displaceable rings each include a first and second ring, each said ring being asymmetrically positioned around a teat inserted into a milk collector, and when activated said second ring of said pair of complementary rings is displaced in a direction opposite to the direction of displacement of said first ring of the pair, thereby compressing the teat.

8. An apparatus according to claim 1 wherein said housing is cylindrically-shaped.

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9. A system for milking an animal, said system including:
at least one apparatus for gripping the teat of an animal and assisting in drawing milk from the animal via a compressible milk collector, said apparatus including:

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a housing;

a plurality of constricting elements arranged in said housing in touching relation to the milk collector, said constricting elements being selectively operable in constricting and non-constricting modes;

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means for selectively switching said constricting elements, back and forth between the non-constricting and constricting modes; and

a controller in communication with said means for selectively switching, said controller operative to effect a predetermined timing and sequence for periodically switching said constricting elements between the constricting and non-constricting modes; and

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a milking claw in flow communication with the milk collector and which collects milk accumulated within the milk collector, said claw having a vent to maintain atmospheric pressure on the teat;

a suction generating means that draws milk from said claw; and

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a collection vessel in flow communication with said suction generating

means in which milk drawn from said milking claw is collected.

10. A system according to claim 9, wherein said constricting elements are pneumatically inflatable sack-like elements.

11. A system according to claim 10, wherein said means for selectively switching is a pneumatic means.

5 12. A system according to claim 11, wherein said pneumatic means includes an air compressor and pneumatic air valves, said valves operated by said controller.

10 13. A system according to claim 9, wherein said constricting elements are pairs of complementary displaceable rings.

14. A system according to claim 13, wherein said means for selectively switching is a cam-based mechanical switching system.

15 15. A system according to claim 13, wherein said pairs of complementary displaceable rings each include a first and second ring, each said ring being asymmetrically positioned around a teat inserted into a milk collector, and when activated said second ring of said pair of complementary rings is displaced in a direction opposite to the direction of displacement of said 20 first ring of the pair, thereby compressing the teat.

16. A system according to claim 9, wherein said housing is cylindrically-shaped.

25 17. A method for milking an animal, wherein said method includes the steps of:

positioning a teat of the animal in a compressible milk collector;

constricting the teat at a point near the udder-teat junction of the animal;

constricting the remainder of the teat in a predetermined temporal and

30 spatial sequence;

releasing the constricted teat after all milk in the teat has been expressed therefrom, thereby allowing the teat to return to its unconstricted state, the expressed milk flowing into the milk collector; and

repeating the steps of constricting and releasing until termination of the milking operation.

18. A method according to claim 17 wherein said step of constricting
5 the remainder of the teat includes constricting individual sections of the teat in a predetermined sequence in a direction away from the udder, the individual sections being held constricted until all sections of the teat have been constricted.

10 19. A method according to claim 18, wherein said predetermined sequence of constricting individual sections is a linear sequence wherein each section is constricted after its immediately preceding section.

15 20. A method according to claim 18, wherein said step of releasing includes releasing all sections of the constricted teat simultaneously.

21. A method according to claim 17, wherein said step of constricting the remainder of the teat includes constricting individual sections of the teat in a predetermined sequence in a direction away from the udder, each individual
20 section being held constricted only until the next section is constricted, the next section being the adjacent section further away from the udder.

22. A method according to claim 21, wherein said step of releasing includes releasing a constricted section of the teat after the next adjacent section
25 of the teat in a direction away from the udder has been constricted.

23. A method according to claim 22, wherein said step of releasing further includes releasing the constricted section of the teat furthest from the udder after substantially all the milk in the teat has been expressed.

30 24. A method for milking, wherein said method includes the steps of:
positioning a teat of an animal in a compressible milk collector and further positioning the teat and milk collector within a gripper apparatus;

activating a portion of the gripper apparatus so that the section of the teat nearest the udder-teat junction of the animal is constricted;

activating the remaining portions of the gripper apparatus so that the remaining sections of the teat are constricted in a predetermined temporal and
5 spatial sequence beginning at the portion of the teat closest to the udder and proceeding to the portion of the teat furthest from the udder;

releasing the constricted teat after all the milk in the teat has been expressed therefrom, thereby allowing the teat to return to its non-constricted state, the expressed milk flowing into the milk collector; and

10 repeating said steps of activating and releasing until termination of the milking operation.

25. A method according to claim 24, wherein the gripper apparatus includes constricting elements which are individually and in a predetermined sequence brought into their constricting mode from their non-constricting mode while proceeding in a direction away from the udder of the animal.
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26. A method according to claim 25, wherein said step of releasing includes releasing all of the constricting elements of the gripper apparatus
20 simultaneously after all the elements have been activated, thereby returning them all to their non-constricting mode from their constricting mode.

27. A method according to claim 25, wherein said step of positioning includes the step of positioning the junction of the teat and udder near a first
25 constricting element, where such first constricting element is the element closest to the animal's udder.

28. A method according to claim 24, wherein the gripper apparatus includes constricting elements which are individually and in a predetermined sequence brought into their constricting mode from their non-constricting mode while proceeding in a direction away from the udder of the animal, each
30 constricting element being activated after the activation of its preceding adjacent constricting element in the direction toward the udder, while all other preceding

constricting elements have been returned to their non-constricting mode.

29. A method according to claim 28, wherein said step of positioning includes the step of positioning the junction of the teat and udder near a first 5 constricting element, where such first constricting element is the element closest to the animal's udder.

30. An apparatus for gripping the teat of an animal and assisting in drawing milk from the animal via a compressible milk collector, said apparatus 10 including:

a housing;
a plurality of constricting elements arranged in said housing in touching relation to the milk collector, said constricting elements being selectively operable in constricting and non-constricting modes; and
15 means for selectively switching said constricting elements, back and forth between said non-constricting and constricting modes, thereby to compress the teat of the animal drawing milk therefrom.

31. An apparatus according to claim 30, wherein said constricting 20 elements are pneumatically inflatable sack-like elements

32. An apparatus according to claim 31, wherein said means for selectively switching is a pneumatic means.

25 33. An apparatus according to claim 32, wherein said pneumatic means includes an air compressor and pneumatic air valves.

34. An apparatus according to claim 30, wherein said constricting elements are pairs of complementary displaceable rings

30 35. An apparatus according to claim 34, wherein said means for selectively switching is a cam-based mechanical switching system.

36. An apparatus according to claim 35, wherein said pairs of complementary displaceable rings each include a first and second ring, each said ring being asymmetrically positioned around a teat inserted into a milk collector, and when activated said second ring of a pair of complementary rings
5 is displaced in a direction opposite to the direction of displacement of said first ring of the pair, thereby compressing the teat.